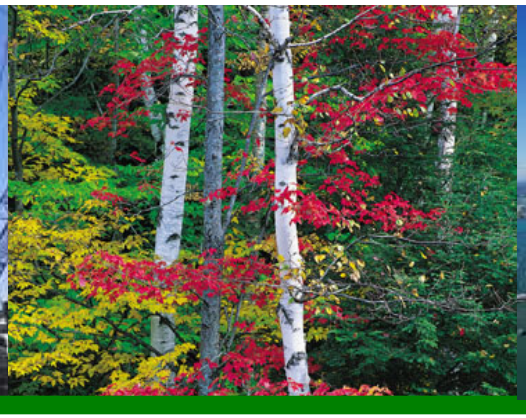





Update on

Cap and Trade Programs for SO_2 and NO_X

Presentation for

Environmental Markets Association

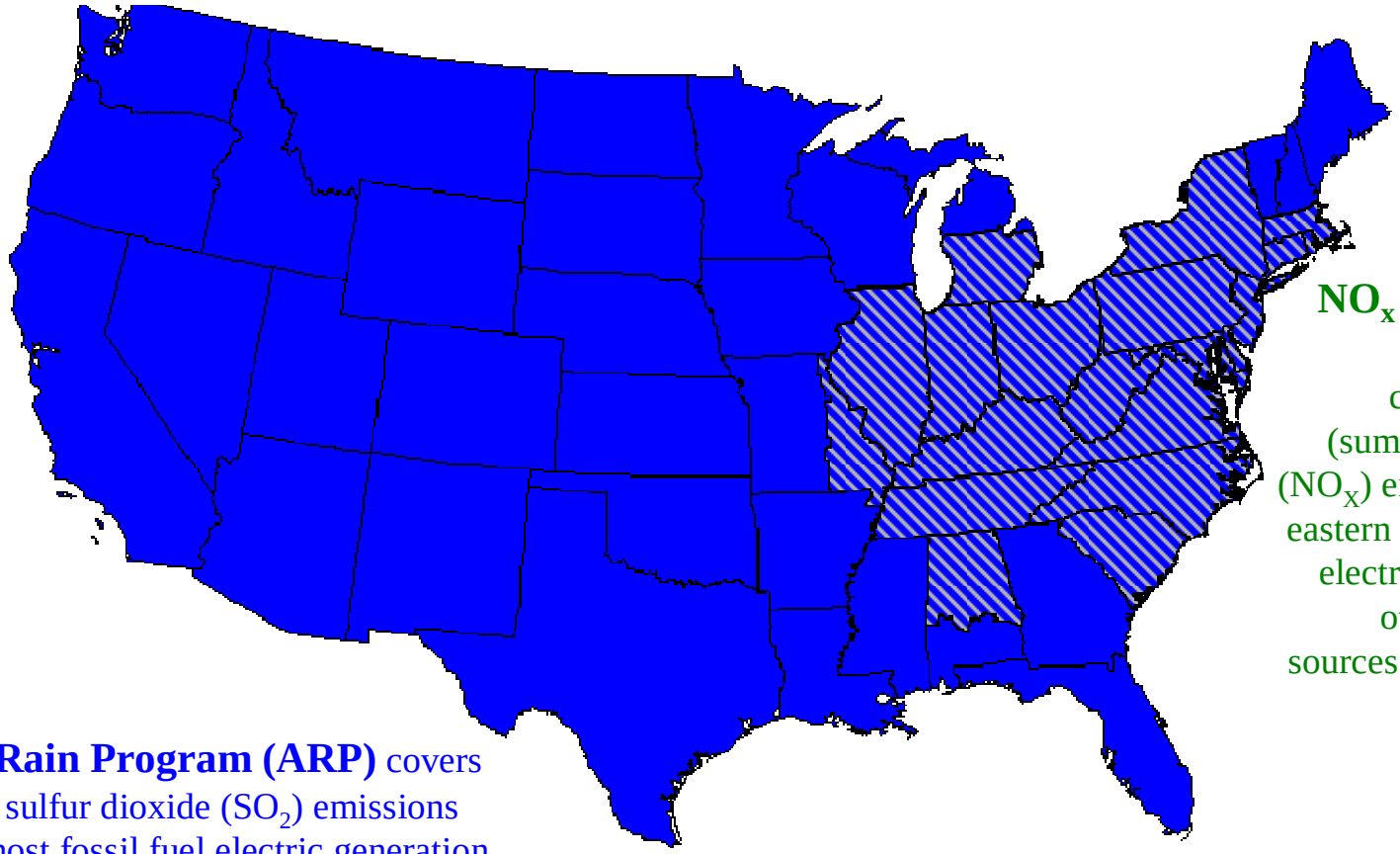
12th Annual Spring Conference

Clean Air Markets Division
U.S. Environmental Protection Agency
Office of Air and Radiation
April 30, 2008

CLEAN AIR MARKET PROGRAMS

UNITED STATES • ENVIRONMENTAL PROTECTION AGENCY •

Trading Programs to Address Acid Rain and Eastern Smog Continue to Provide Large Benefits Cost-effectively



NO_x Budget Trading Program (NBP) covers ozone-season (summer) nitrogen oxide (NO_X) emissions in selected eastern states for fossil-fuel electricity generation and other large stationary sources. Program phased in from 2003 to 2007

Acid Rain Program (ARP) covers annual sulfur dioxide (SO_2) emissions from most fossil fuel electric generation units. Program implemented in two phases: 1995 for largest SO_2 emitters; 2000 for all others

Programs rely on an emissions <u>cap</u> with air emission allowances that can be <u>traded</u> – cap and trade

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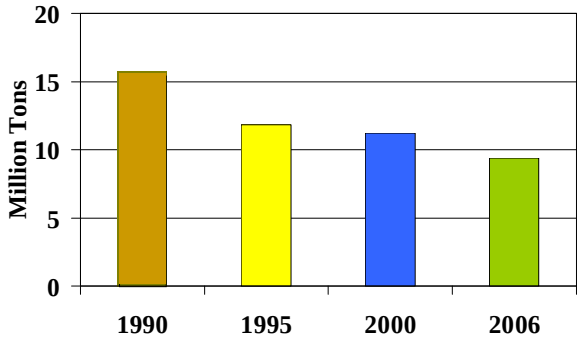
SO_2 Emissions Have Fallen in Most States

State-by-state SO_2 Emission Levels from Acid Rain Program-affected Sources (1990-2006)

Acid Rain Emissions of SO_2

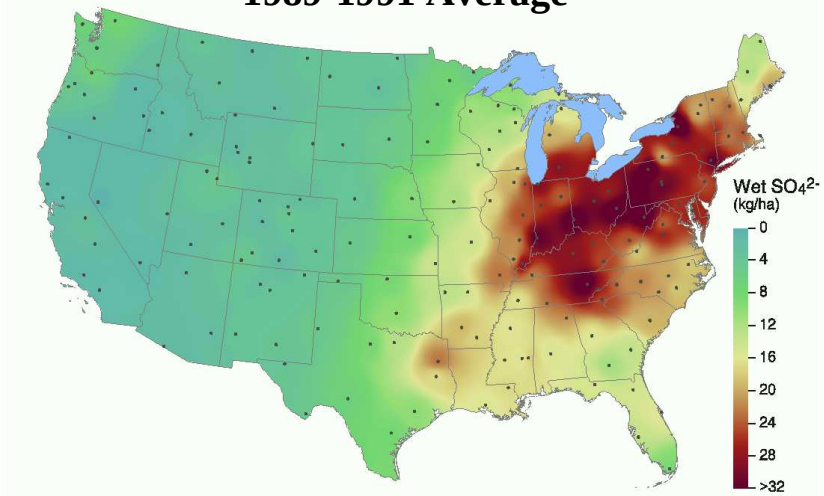


Source: EPA, 2007

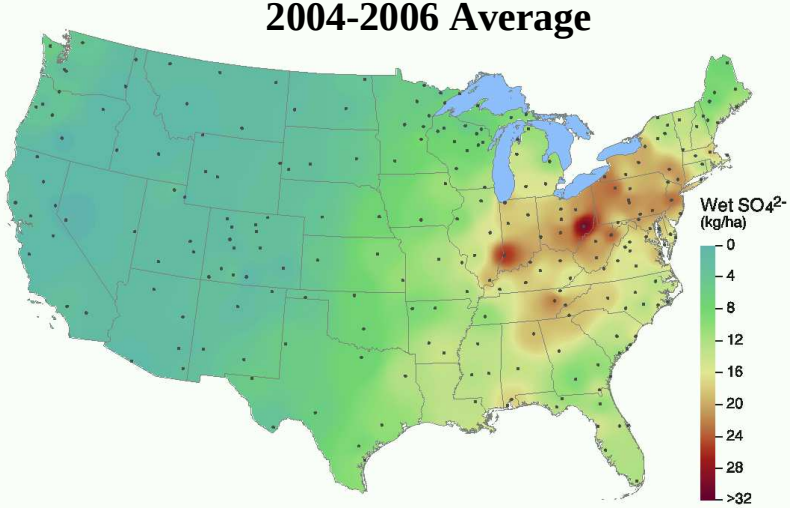
Acid Rain Program Progress

Annual Mean Wet Sulfate Deposition

1989-1991 Average



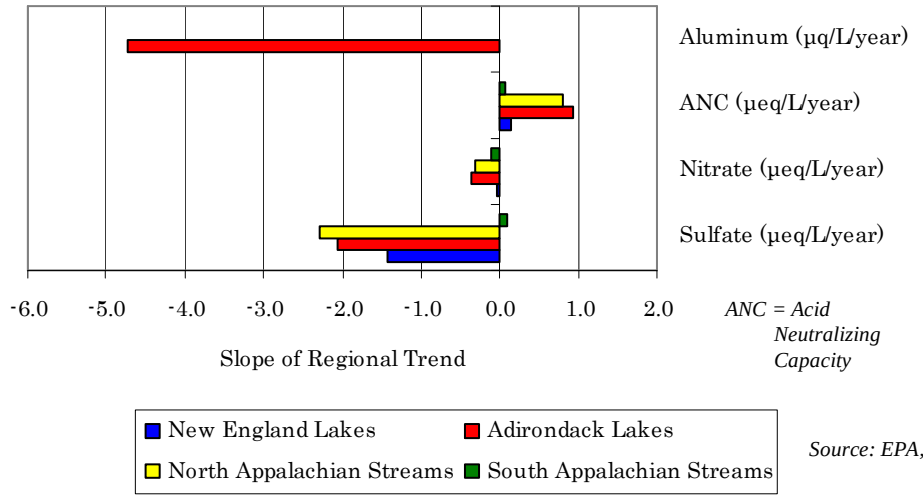
2004-2006 Average



Source: NADP

USEPA/CAMD 07/19/07

Water Quality Improvements, 1990-2005



ANC = Acid Neutralizing Capacity

Source: EPA, 2007

Substantial Gains:

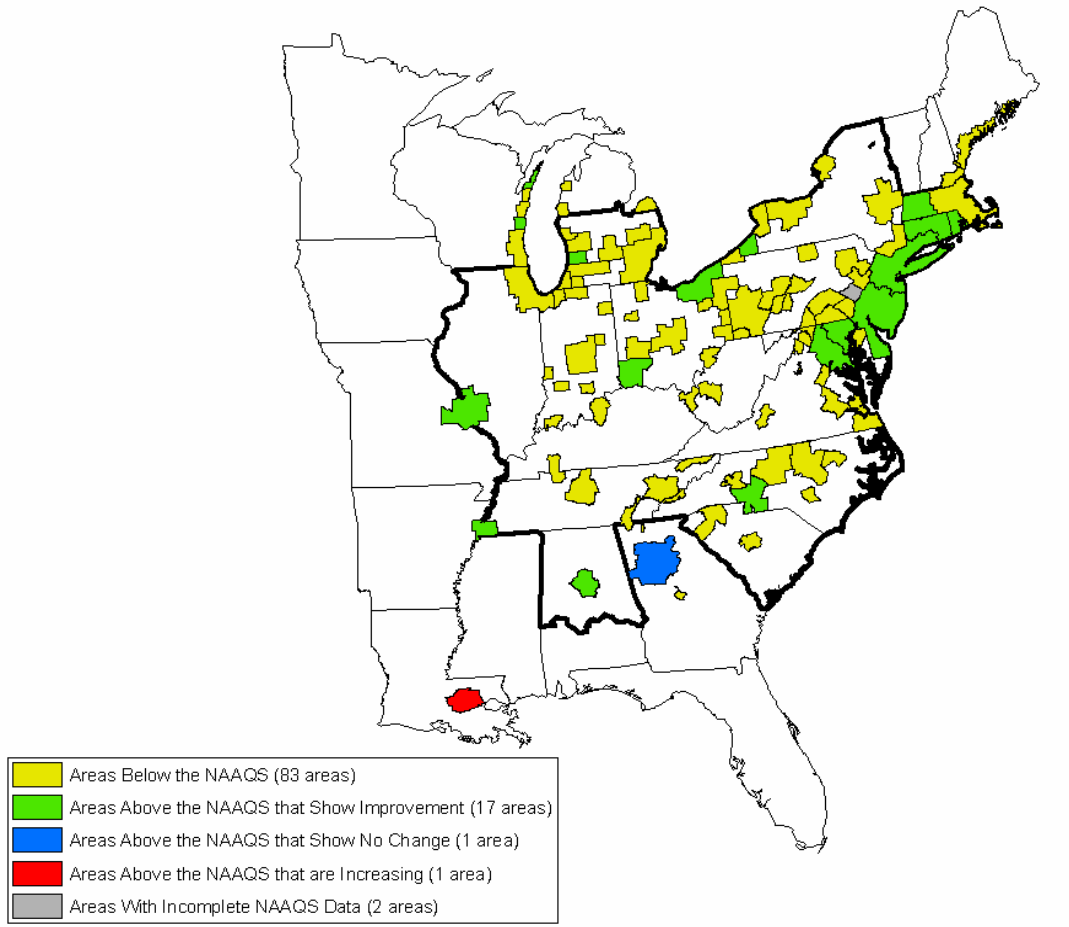
- Reduced "Acid Rain"
- Improved Air and Water Quality
- Improved Health (lives extended and ailments reduced)
- Reduced Regional Haze
- Provided Other Benefits

Ozone Attainment Has Improved Dramatically

The NO_X Budget Trading Program is the most significant contributor (of EPA and state programs) to ozone improvements in the East

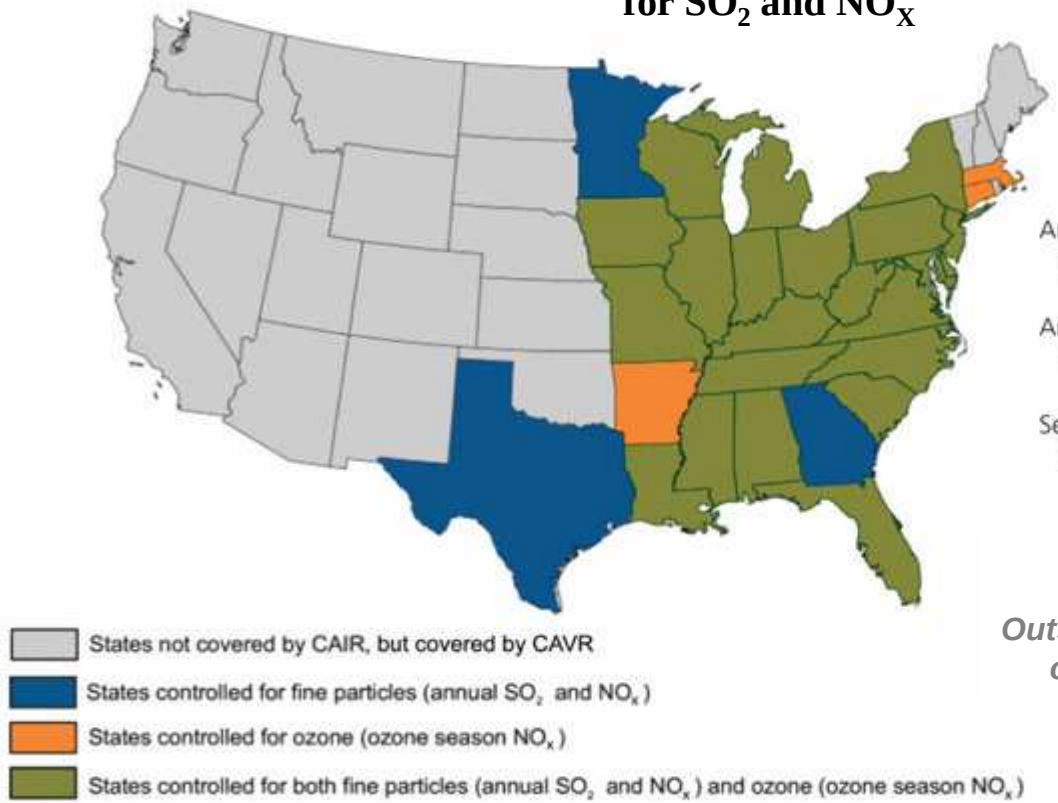
- In 2004, EPA designated 104 areas in the East as 8-hour ozone NAAQS nonattainment areas
- 2004-2006 data show ozone air quality improvements in virtually all of these areas, bringing cleaner air to over 55 million people
- In 2006, four out of five of the original nonattainment areas met the ozone standard

Changes in 8-Hour Ozone Nonattainment Areas in the East
2001-2003 (Original Designations) Versus 2004-2006



Next Generation Programs: Clean Air Interstate and Visibility Rules

States Covered in Clean Air Interstate Rule (CAIR) and Clean Air Visibility Rule (CAVR) for SO_2 and NO_X



CAIR Emission Caps*
(million tons)

	2009/2010	2015
Annual SO_2 *(2010)*	3.7	2.6
Annual NO_x *(2009)*	1.5	1.3
Seasonal NO_x *(2009)*	0.6	0.5

**for the affected regions*

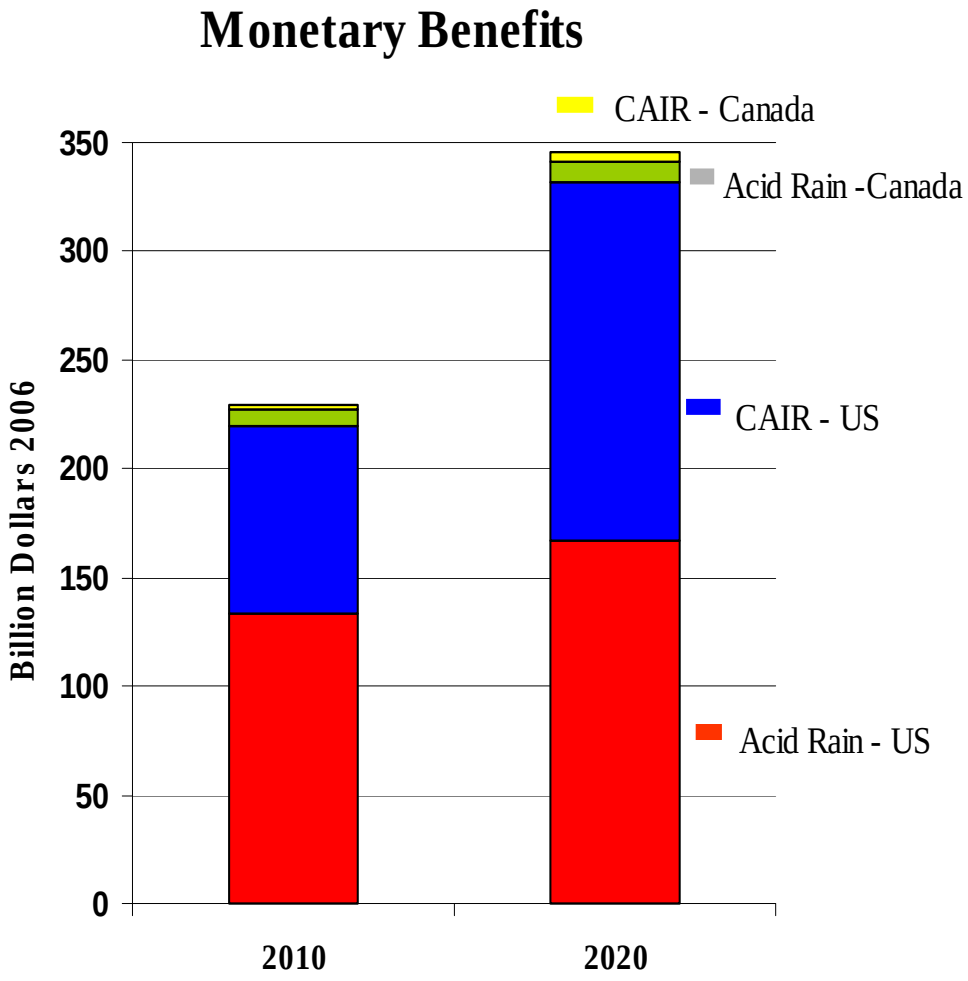
CAVR

Outside of CAIR Region – BART controls or States can create trading programs

Source: EPA, 2007

Note: On February 8, 2008, the U.S. Court of Appeals issued a decision vacating the Clean Air Mercury Rules (CAMR) and thereby suspending the program that allowed mercury emissions trading. An appeal of the Court's decision has been filed and pending before the Court.

Benefits of Acid Rain and CAIR Programs



Source: EPA 2007 and 2008

- Majority of benefits result from:
  - Avoidance of premature deaths*
  - Reduced aggravation and incidence of heart and lung ailments
- Other benefits include increased worker productivity, reduced absences from school and work, and visibility improvement in some parks
- Benefits not included in estimates:
  - Acid rain environmental benefits
  - Mercury co-benefits
  - Remaining visibility benefits from parks and urban areas
  - Others

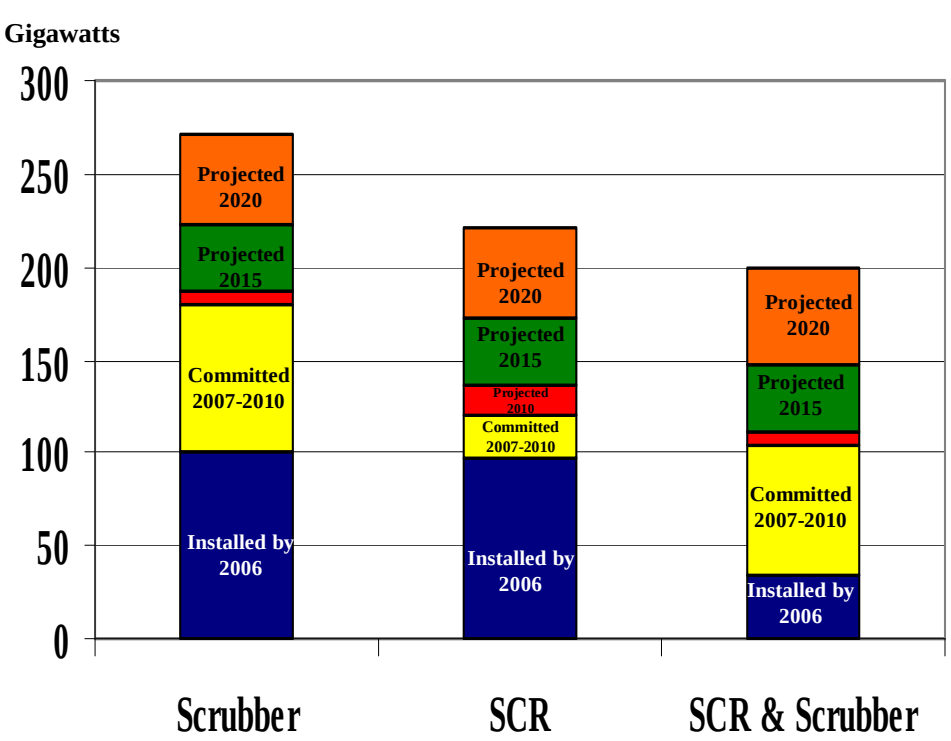
• EPA has estimated that these programs lead to the annual avoidance of about 32,000 and 42,000 premature deaths in 2010 and 2020, respectively.

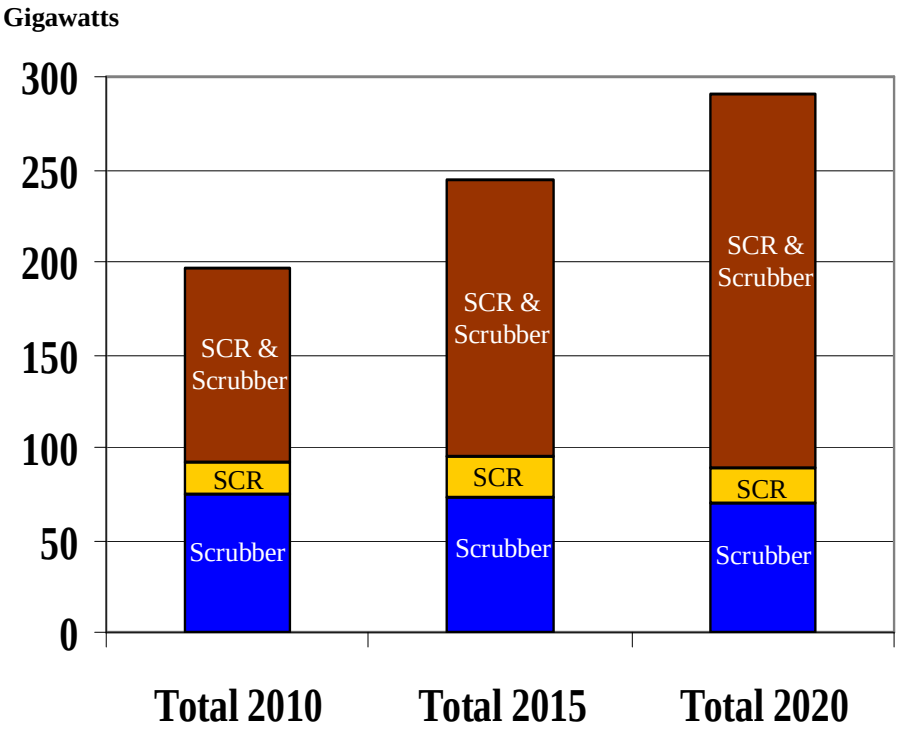
Where We Are on Implementation…

- **Acid Rain Program**
  - 2008: EPA held auction and previews new emissions reporting option. Completing 2007 "true up"
- **NO_x Budget Program**
  - Missouri enters program in 2007, May 1 starts the 2008 ozone season

- **CAIR Programs**
  - CAIR NO_x programs require emissions monitoring and reporting beginning **January 1, 2008**
  - **State Implementation Plans (SIPs)**
    - **All States are using the trading program**
    - EPA has recorded initial NO_x allocations in nearly all States (Most under state-devised plans)
    - **All States that submitted** CAIR State Implementation Plans (SIPs) have **received approval**
  - **Federal Implementation Plan (FP)**
    - **FIP in effect June 2006**
    - Implementation is underway by power industry
  - **Litigation**
    - Challenges to CAIR pending before the D.C. Circuit (oral argument held March 25, 2008)
    - Challenge to EPA's Denial of North Carolina's 126 Petition stayed pending decision in the CAIR case

Advanced Pollution Controls for SO_2 and NO_X that Are Installed, Committed to, and Projected for Coal-fired Generation



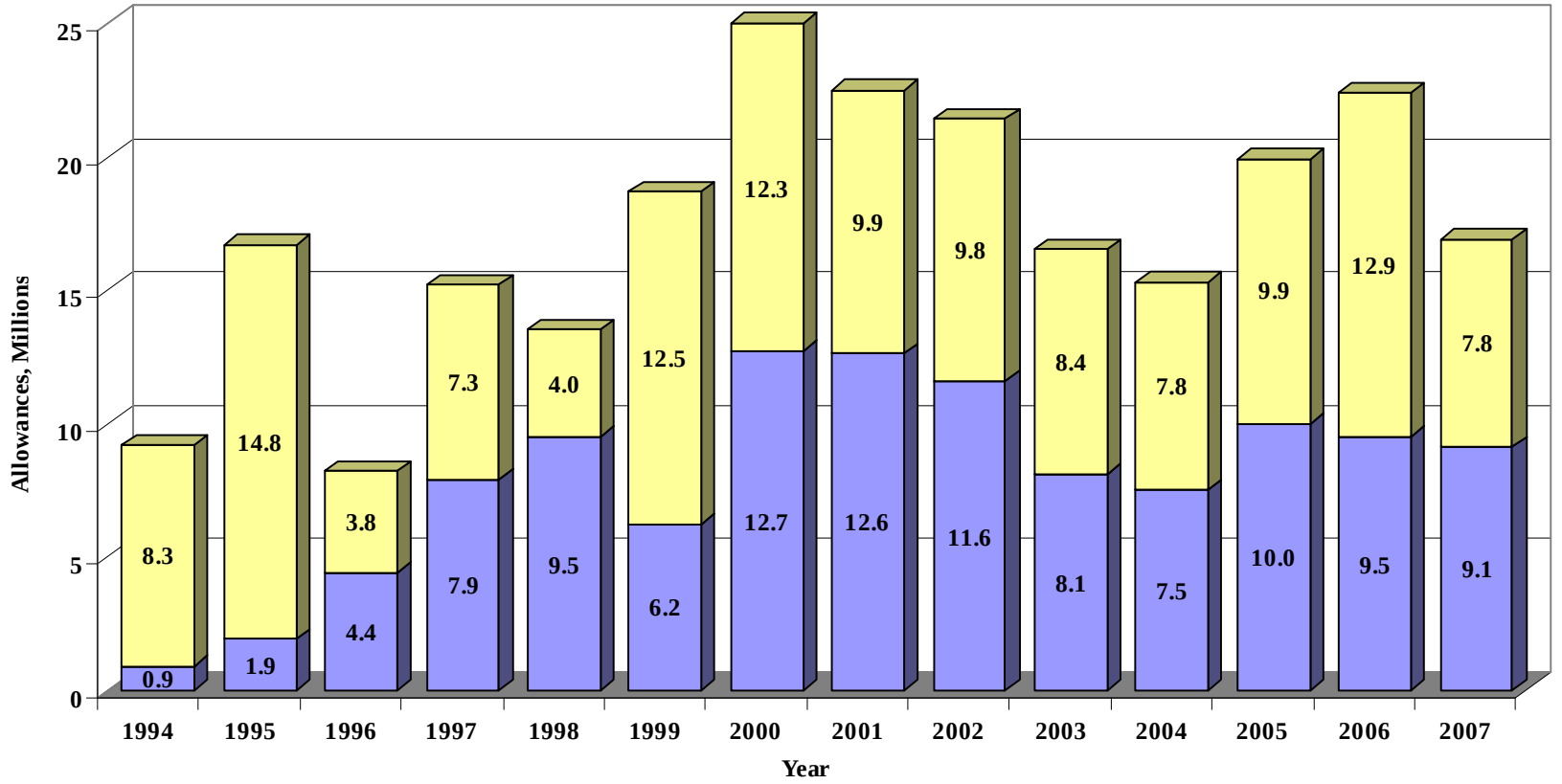


The left bar graph provides the amount of coal-fired steam capacity that has either Scrubbers, SCRs, or both technologies in place by 2006 (from EPA's NEEDs database 2007), committed to be operational from 2007-2010 (largely from 2007 survey results), and forecasted by EPA (using IPM) to be operating by the end of 2010, 2015, and 2020, respectively. In 2006, 2010, 2015, and 2020, the total coal-fired capacity is 318 GW, 320 GW, 335 GW and 373 GW, respectively. The right bar graph shows for 2010, 2015, and 2020 the amount of coal-fired steam capacity with Scrubbers, SCRs, or both controls. Both bar graphs included existing and new generation capacity. Virtually all coal-fired generation units have advanced particulate control systems. Some additional units will have SNCR controls and EPA expects virtually all of these units to have NOx combustion controls and the vast majority of the "nonscrubbed" units to use lower sulfur coals.

Private SO_2 Allowance Transfers

Market is healthy based on volumes

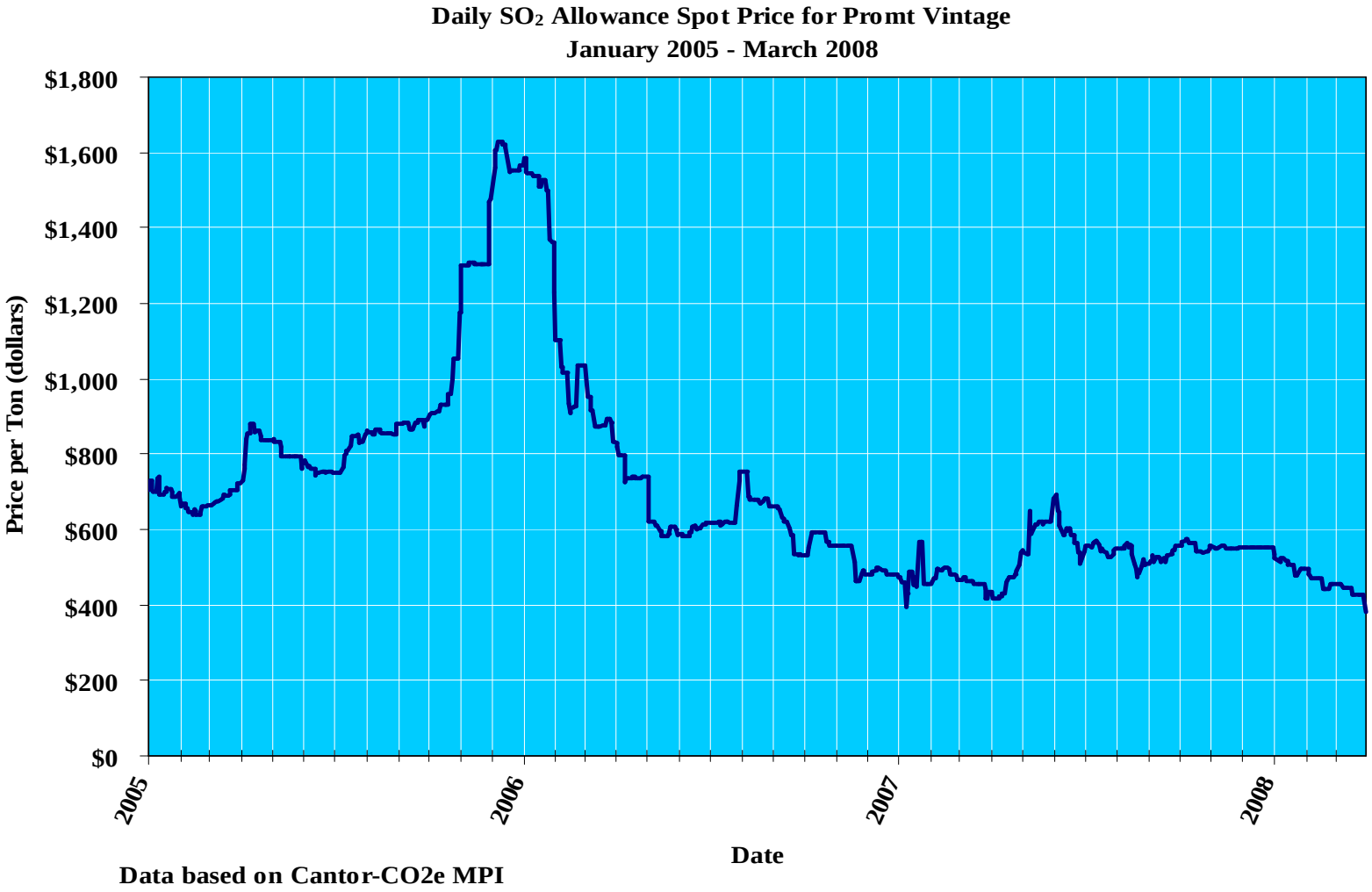
Breakdown of Private SO_2 Allowance Transfers 1994-2007*



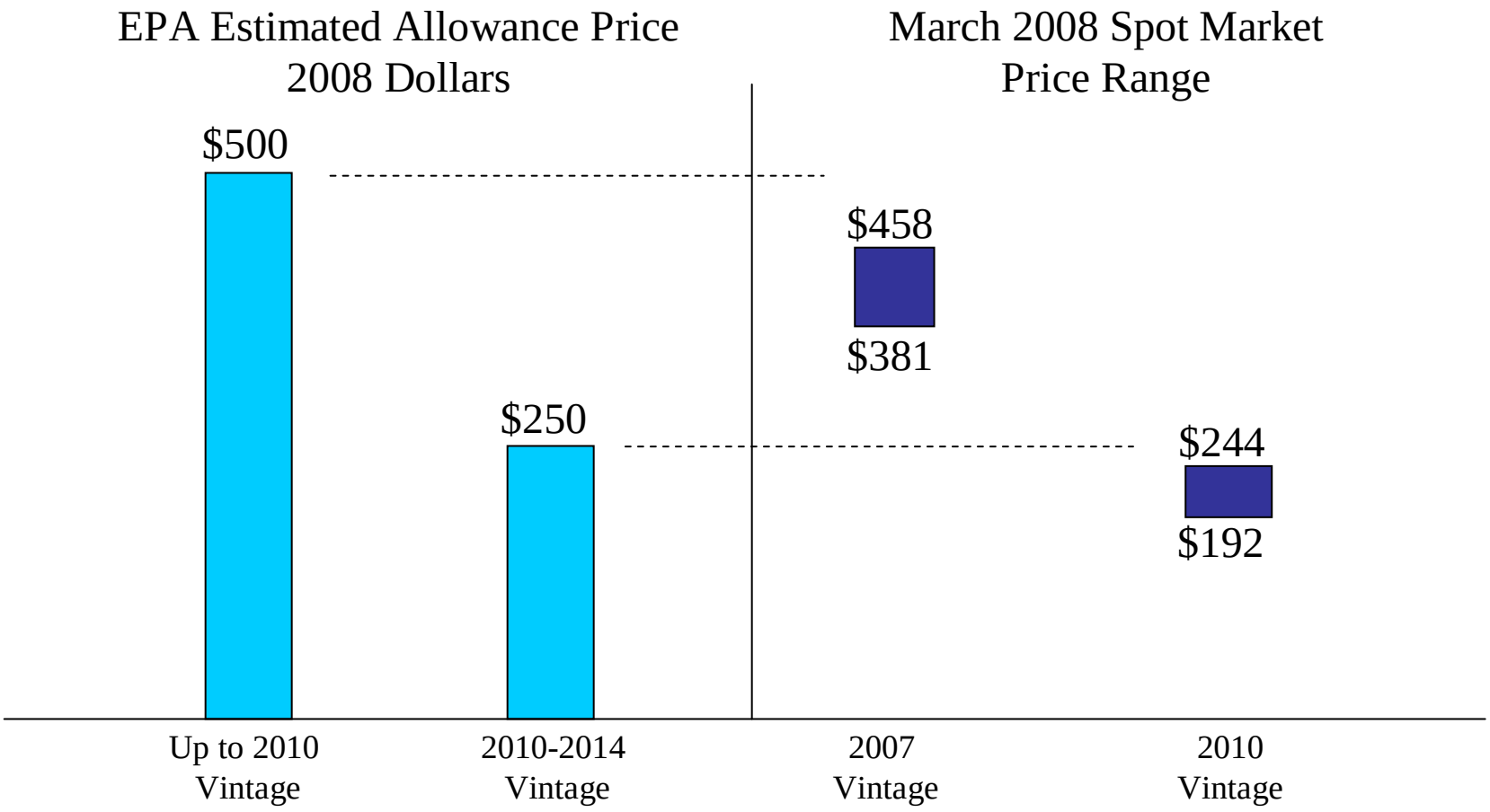
*Note: 2007 results based on preliminary analysis

Daily SO_2 Allowance Spot Price

A detailed look at the last 3 years finds prices are down following the December 2005 price spike and relatively stable



Estimated & Actual SO_2 Allowance Prices



Sources: Estimates derived from EPA forecasted prices; Spot market prices, CantorCO2e & Evolution Markets

Historical NO_X Allowance Prices (spot)

NO_X Budget Program NO_X Allowance Spot Price (Prompt Vintage)
January 2005 – March 2008

Before the NBP began, EPA estimated that in 2007 allowance prices would be over $5,000 per ton (in 2006 $)

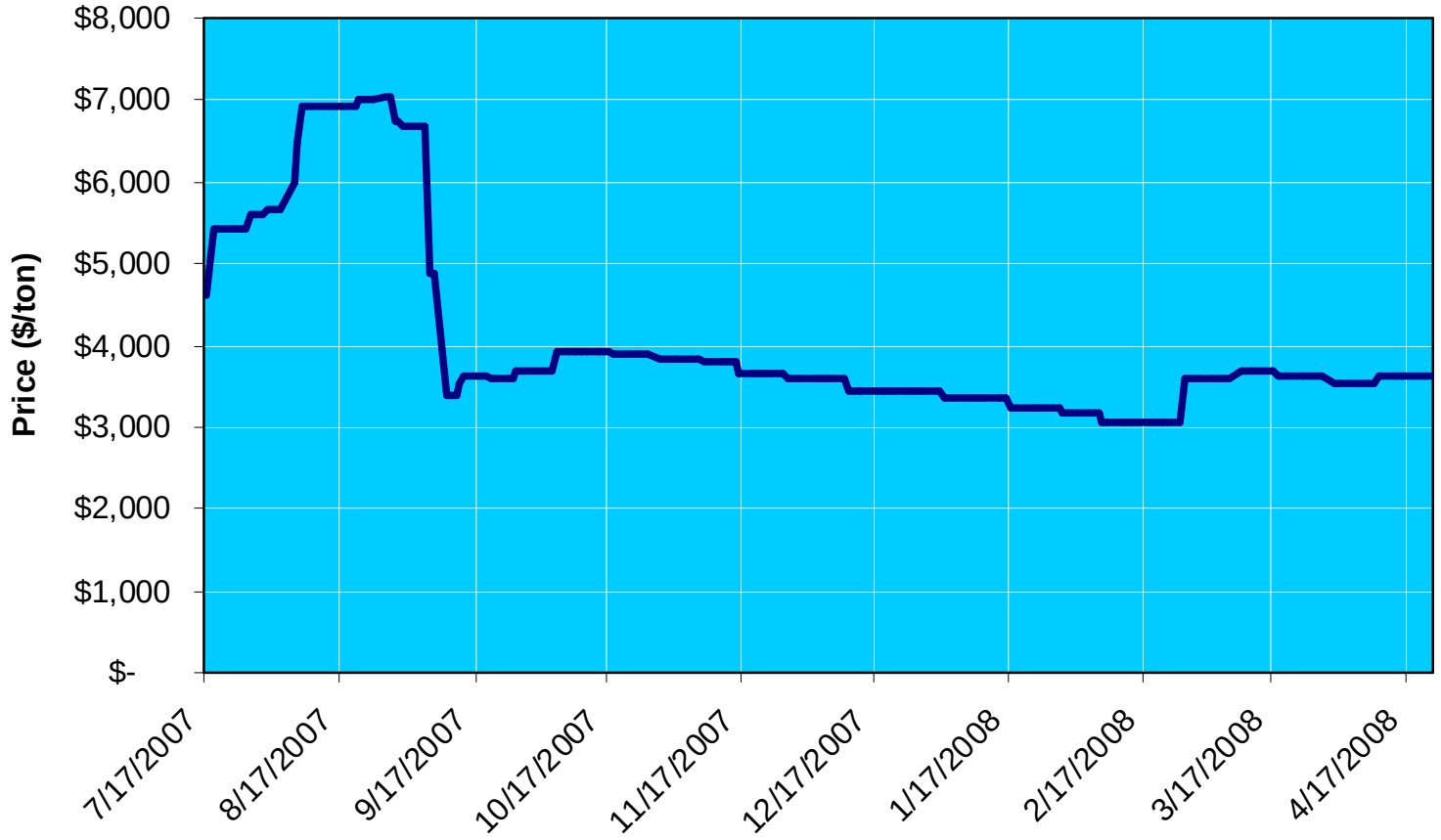
Notes:

1. **Data Source: CantorCO2e's Market Price Indicator (MPI). See www.emissionstrading.com**
2. **Prompt vintage is the vintage for the "current" compliance year.**

Historical 2009 CAIR NO_X Annual Allowance Prices

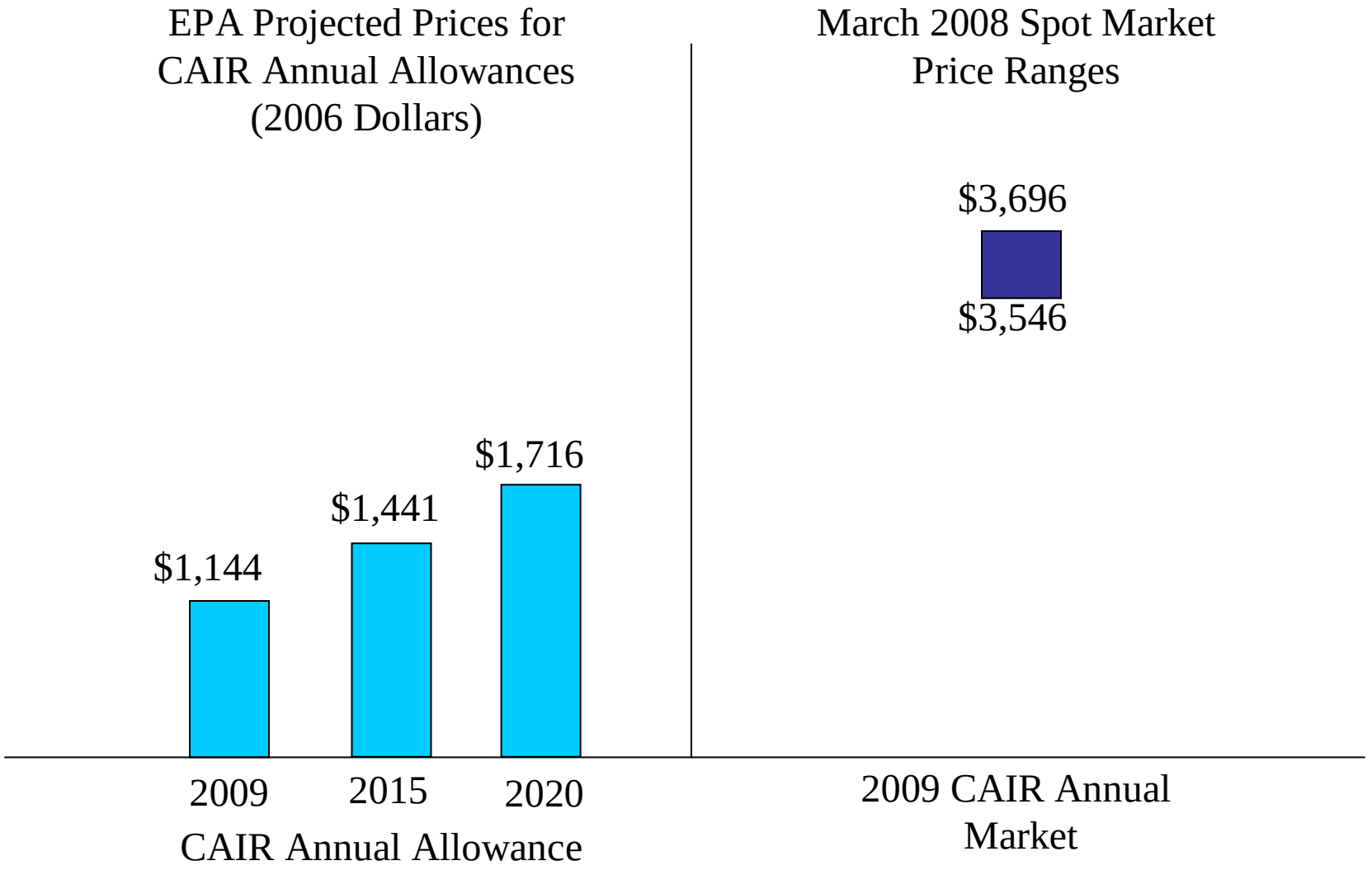
CAIR NO_x Annual Market Price Indicator

July 2007 – April 2008



Source: CantorCO2e (www.emissionstrading.com)

Forecasted & Actual CAIR Annual NO_X Allowance Prices



Sources: Forecasted price, EPA, 2006; Spot market prices, CantorCO2e (3/1/2008 – 3/31/2008).

CAIR Annual NO_X Allowance Prices

- **EPA's recent re-examination of market fundamentals suggests that prices for 2009 annual NO_X allowance should be between $1,500 to $2,000 per ton**

- **Current market not driven by those cost fundamentals**
  - A 400% capital cost increase would be needed for an SCR installation to approach $3,000 per ton NO_X removal (when compared to current IPM inputs)
  - Only a small amount of trading is occurring with apparent risk averse buyers
  - New access to NO_x allocations may lead to price changes

Recent Market Events

- **EPA market tracking and analysis** of allowance holdings suggests no one dominates the emission trading markets. **FERC** monitors this market and shares EPA's view
- There has been recent interest in monitoring markets:
  - On **September 18**, **the Commodities Futures Trading Commission (CFTC)** held a hearing on the potential for enhanced oversight of energy markets, including emission markets
  - On **October 24**, the **House Committee on Agriculture**, which oversees the CFTC, held a hearing on oversight of Exempt Commercial Markets (ECMs)
  - The Senate passed legislation co-sponsored by Senators Feinstein, Levin, and Snowe as part of the Farm Bill in **December of 2007** that would increase federal oversight authority to detect and prevent manipulation in U.S. electronic energy markets, create an audit trail, and increase transparency
    - This legislation is now in conference with the House of Representatives as part of the Farm Bill

Visit the Clean Air Markets Division Web Site

- Emissions data
- Allowance transfers
- Information on the acid rain and NO_X trading programs
- Program rules and guidelines
- Studies and reports

www.epa.gov/airmarkets

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